

# SHRI MATA VAISHNO DEVI UNIVERSITY, KATRA

School of Electronics & Communication Engineering  
B. Tech. (ECE) Minor-I Examination (Even) 2018-19

Entry No: 17BEC033

Total Number of Pages: [01]

Date: 07.02.2019

Total Number of Questions: [04]

Course Title: Digital Communication Engineering

Course Code: ECL 2152

Time Allowed 1.5 Hours

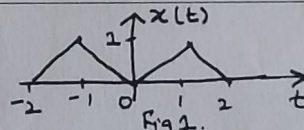
Max Marks: [20]

## Instructions / NOTE

- Attempt All Questions.
- Support your answer with neat sketches/diagrams, wherever appropriate.
- Assume any missing data to suit the case / derivation / answer.

### Section - A

Q1.	(a) Why are digital techniques preferred over analog techniques for transmitting voice signals? Explain the block diagram of Digital Communication System.	[03]	CO1
	(b) Determine the fundamental period of these signals i. $\cos\left(\frac{\pi}{4}t\right) + \sin\left(\frac{\pi}{3}t\right)$ ii. $\sin\sqrt{2}t + \cos 2t$	[02]	CO2
Q2.	(a) The signal $x(t)$ is shown in fig.1. Find the total Energy.	[02]	CO1
	(b) A sinusoidal message signal is converted to a PCM signal using a uniform quantizer. The required signal-to-quantization noise ratio (SQNR) at the output of the quantizer is 40 dB. The minimum number of bits per sample needed to achieve the desired SQNR is	[02]	CO3



### Section - B

Q3.	(a) A signal $x(t) = 100 \cos(24\pi \times 10^3 t)$ is ideally sampled with a sampling period of 50 $\mu$ sec and then passed through an ideal low pass filter with cutoff frequency of 15 KHz. Which of the following frequency is/are present at the filter output?	[02]	CO2
	(b) In a PCM system with uniform quantization, increasing the number of bits from 8 to 9 will reduce the quantization noise power. Explain how much quantization noise power will be reduced?	[03]	CO3
Q4.	(a) What are the factors on which the performance of digital communication system is defined? Elaborate	[03]	CO1
	(b) Explain how PPM and PWN signals can be generated from PAM Signals & Compare all the three techniques PAM, PWM, PPM	[03]	CO2

### Course Outcomes

- CO1 Understand the theoretical aspects and elements of digital communication system, useful for today's multidisciplinary applications
- CO2 Understand and analyze the fundamental concepts of sampling theorem, quantization and coding in engineering applications of digital transmission
- CO3 Understand and analyze the different types of digital, pulse, pass and band pass modulation techniques & Shift keying Methods
- CO4 Able to Analyze and Calculate probability of error in presence of noise for digital communication system.

CO	Questions Mapping	Total Marks	Total Number of Students (to be appeared in Exam)
CO1	1(a), 2(a), 3(a)	8	
CO2	1(b), 3(a), 4(b)	7	
CO3	2(a), 3(b)	5	
CO4			